

REDEFINITION OF THE GENUS *CHELANOPS* GERVAIS (PSEUDOSCORPIONIDA: CHERNETIDAE)

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Abstract.—The type material of *Chelifer (Chelanops) coecus* Gervais, type species of the genus *Chelanops* Gervais, is lost, and the diagnostic characters of the genus are uncertain. A neotype series from near the original type locality in southern Chile has been studied, and new descriptions of the species and genus are presented.

Key Words.—Arachnida, Pseudoscorpionida, Chernetidae, *Chelanops*, emended diagnosis, *Chelanops coecus*, neotype designation, redescription.

The genus *Chelanops* was established originally as a separate section of *Chelifer*, with *Chelifer coecus* as type species (Gervais 1849: 13). The description of *C. coecus* was very sketchy by modern standards, and the diagnosis of the section *Chelanops* was exceedingly brief. Tömösváry (1882), without comment, placed *Chelanops* in the synonymy of *Chernes*. In a series of papers from 1890 to 1914, Banks, using a very broad (unwritten) definition of the genus, described 28 species of *Chelanops* from North and South America (see Hoff 1947). However, such careful workers as Tullgren (1907), With (1908), and Ellingsen (1910) did not recognize the species or genus in the South American fauna. Joseph (1927) made some observations on the life history of a species which he identified as *Chelanops coecus*, but he included no taxonomic data.

Beier (1932: 177, 1933: 538) recognized *Chelifer (Chelanops) coecus* as the type species of the genus *Chelanops*, but he evidently did not see the type specimens, as he reported the species as an “unsichere Art” and gave no description of it. This did not, however, deter him from giving a diagnosis of *Chelanops*, based apparently on four other species, namely *Chelifer (Trachychernes) rotundimanus* Ellingsen, *Chelifer (Trachychernes) altimanus* Ellingsen, *Chelanops chilensis* Beier, and *Chelanops costaricensis* Beier. Also, he did not include *coecus*, the type species, in the key to species of *Chelanops* because of insufficient description (“ungenügenden Beschreibung”). As a result, Beier’s working concept of the genus *Chelanops* was based not on the type species but on several other species which he believed were congeneric with *coecus* (as it turns out, two of the four species he recognized in 1932–33, *altimanus* and *costaricensis*, belong in other genera—see below).

The true nature of *Chelifer (Chelanops) coecus* Gervais has never been established. Beier (1964b: 307) stated that the original material of Gervais’ Chilean species had been lost. The present whereabouts of the types are indeed unknown; they are not in the Muséum national d’Histoire naturelle, Paris, where they might be expected (J. Heurtault, in litt.) or in any other museum I have contacted, and may be presumed lost.

Fortunately, there are available several series of specimens from near the type locality which Beier identified as *Chelanops coecus* (1964b: 367–368) and which generally conform to the description given by Gervais. I have mounted and stud-

ied a few of these specimens and from them have selected a neotype. On the basis of this new type and conspecific specimens, I have prepared a redescription of the species *Chelanops coecus* and a redefinition of the genus *Chelanops*.

MATERIALS AND METHODS

The specimens examined here were collected and preserved in alcohol. Many were dissected, cleared, and mounted on slides for detailed study under a compound microscope.

Some abbreviations are used in the text, as follows: L = length; L/B = ratio, length/breadth; L/D = ratio, length/depth; T = tactile seta.

All material dealt with in this study is from the collection of the California Academy of Sciences, San Francisco, California.

SYSTEMATICS

Family Chernetidae Menge

Chernetidae Menge: Muchmore 1982: 101; Harvey 1991: 534 (complete synonymy to 1989); Harvey 1992: 1427.

Genus *Chelanops* Gervais

Chelifer (*Chelanops*) Gervais, 1849: 13. Type species: *Chelifer* (*Chelanops*) *coecus* Gervais.

Chelanops Gervais: Beier 1932: 177; Beier 1933: 538; Hoff 1947: 503; Hoff 1949: 455, 460; Beier 1964b: 370; Harvey 1991: 553.

Stigmachernes Beier 1957: 457; Harvey 1991: 634. NEW SYNONYMY (see below).

Diagnosis (emended).—A representative of the family Chernetidae (see Harvey 1992: 1427). With the characters of the type species, *Chelanops coecus*, particularly the following. Well sclerotized and generally dark in color. Carapace with surface lightly granulate; 2 transverse furrows; 2 faint eyespots; numerous narrow, clavodentate setae. Abdominal tergites with 25–30 setae. Male genitalia typical of the family (see Harvey 1992: 1394). Spermathecae of female delicate and easily broken, but apparently consisting of 2 slender tubes of uniform diameter. Cheliceral hand usually with 7 setae, rarely with 8 or 9; flagellum of 4 setae; galea moderate in size, with several small rami. Palp robust, more so in male than in female; surfaces finely to moderately granulate; setae clavodentate to acuminate; each chelal finger with 45–50 marginal teeth and 7–13 external and internal accessory teeth; venom apparatus present only in movable finger of chela. Trichobothria as shown in Fig. 4: on fixed finger, *ist* lies proximad of *est*; on movable finger *st* is closer to *t* than to *sb*. Legs typical of the family, moderately slender; tarsus of leg IV with a long, erect tactile seta distad of middle.

Remarks.—In the possession of four setae in the flagellum of the chelicera, *Chelanops* is allied with some 30 other genera in the Chernetidae (tribe Hesperochernetini Beier 1932 ?). Of these, it appears most closely related to *Stigmachernes* Beier (1957), from the Juan Fernandez Islands, Chile. In most particulars the two genera are very similar, though the spermathecae of *Stigmachernes skottsbergi* Beier, the only known species of *Stigmachernes*, have not yet been described. *Stigmachernes*, undoubtedly, is a synonym of *Chelanops*.

Chelanops is similar to *Epactiochernes* Muchmore (1974b) and *Epichernes* Muchmore (in Muchmore & Hentschel 1982) in general habitus, nature of the spermathecae, and nature and placement of the tactile seta on the tarsus of leg IV. *Chelanops* differs most notably from those two genera in body size, placement of trichobothria *est* and *ist* on the fixed chelal finger, and the number of setae on the hand of the chelicera.

Semeiochernes Beier (1932) seems to be closely related to *Chelanops*. Beier (1954) noted this and decided that the holotype of *Chelanops costaricensis*, one of his original *Chelanops* species, is actually the female of *Semeiochernes militaris* Beier (1932). Mahnert (1987) also mentioned the similarity of the two genera. Though *Semeiochernes* has unique processes on the palpal chela of the male and lacks a tactile seta on the tarsus of leg IV, it is much like *Chelanops* in most other respects, including the spermathecae and the placement of trichobothria *ist* and *est*.

Chelanops strongly resembles *Dinocheirus* Chamberlin (1929) (and see Muchmore 1974a) in body size and shape, but it differs fundamentally from that genus in the nature of the spermathecae and the relative positions of trichobothria *ist* and *est* on the fixed chelal finger.

Neochelanops Beier (1964b: 370) should no longer be considered a subgenus of *Chelanops*. It appears unlikely that *Chelifer (Chelanops) patagonicus* Tullgren, type species of the subgenus, is congeneric with *Chelanops coecus*. In addition to the differences mentioned by Beier, the two species differ in the size and location of the tactile seta on the tarsus of leg IV: that of *coecus* is long and erect, and located just distad of the middle of the tarsus, but that of *patagonicus* is small, "pseudotactile," and near the end of the segment. The actual status of *Neochelanops* must await restudy of the type material of *Chelifer (Chelanops) patagonicus* (if available). The other species presently assigned to *Neochelanops* also need to be reevaluated.

Chelanops coecus (Gervais)
(Figs. 1–7)

Chelifer (Chelanops) coecus Gervais, 1849: 13. Type locality: southern Chile, near Calbuco.

Chelifer coecus Gervais: With 1908: 327.

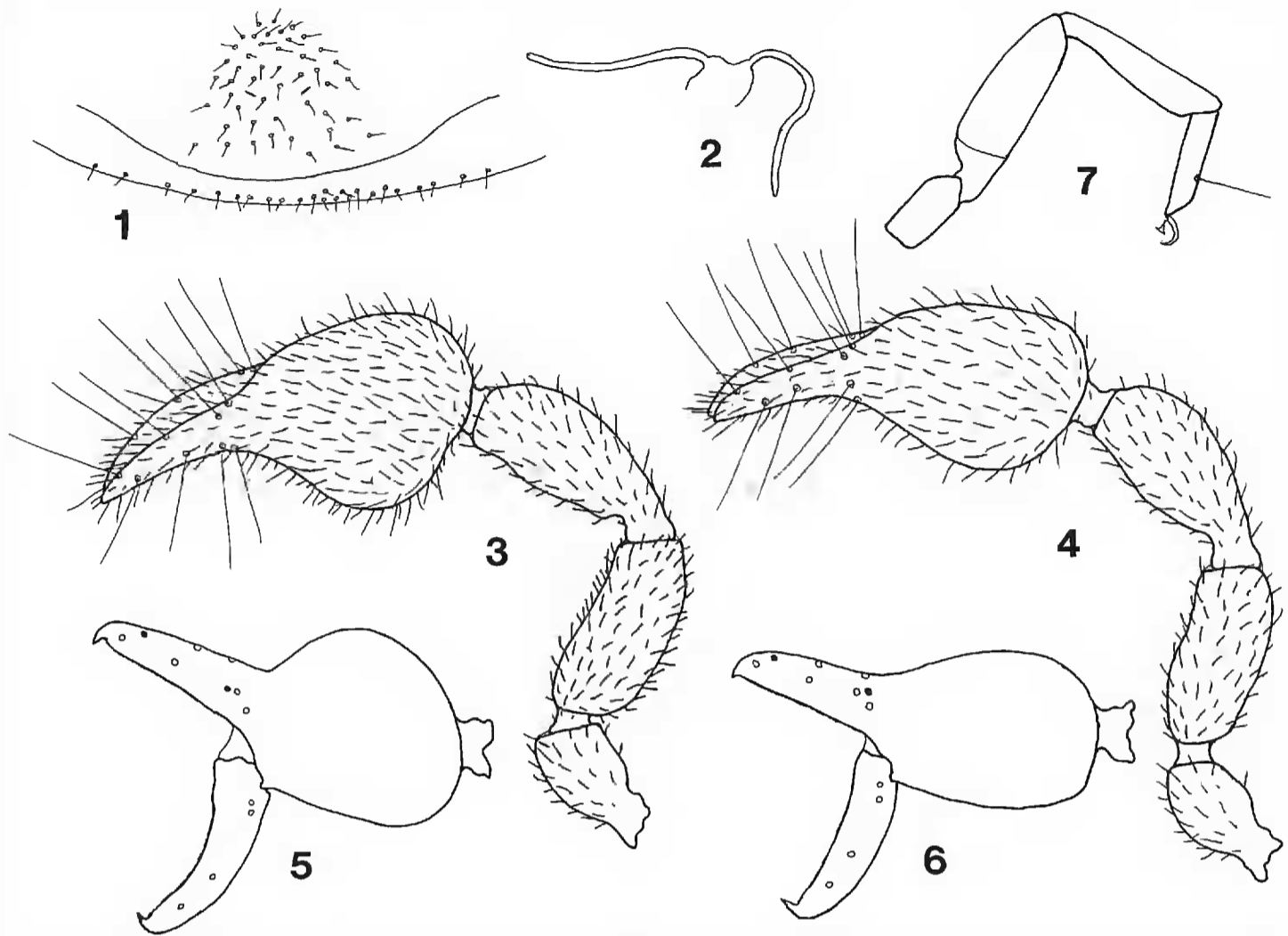
Chelifer (Trachychernes) rotundimanus Ellingsen, 1910: 379 (synonymized by Beier 1959: 215).

Chelanops (?) coecus (Gervais): Beier 1932: 179.

Chelanops (Chelanops) coecus (Gervais): Beier 1964b: 367; Harvey 1991: 554 (complete synonymy to 1989).

Chelanops chilensis Beier 1932: 178, fig. 186; Beier 1933: 538, fig. 10; Harvey 1991: 554. NEW SYNONYMY.

Redescription of adults.—Males and females similar, but palpal chelae of males more robust. Carapace and tergites light brown, palps dark reddish brown, other parts tan. Carapace longer than broad; surface lightly granulate, with 2 shallow, transverse furrows; no eyes; about 200 narrow clavodentate setae, 6–10 at anterior and 14–18 at posterior margin. Abdominal tergites 1–11 and sternites 4–10 divided; surfaces of tergites transversely reticulated to scaly, of sternites nearly smooth; interscutal membranes papillose to scaly; pleural membranes longitudinally papillose; most dorsal setae narrow clavodentate, ventral setae acuminate to denticulate; sternites with numerous "sense spots" scattered



Figures 1–7. *Chelanops coecus* (Gervais). Figure 1. Setae on 2nd and 3rd sternites of allotype female (spiracular setae omitted). Figure 2. Spermathecae of allotype female. Figure 3. Right palp of neotype male, dorsal view. Figure 4. Right palp of allotype female, dorsal view. Figure 5. Left chela of neotype male, lateral view (setae omitted; darkened areoles are underneath). Figure 6. Left chela of allotype female, lateral view. Figure 7. Leg IV of neotype male (most setae omitted).

over surfaces. Tergal chaetotaxy of neotype (male) 24:24:27:31:31:30:33:31:29:28:T18T:2, others, both males and females, similar. Sternal chaetotaxy of neotype (male) 37:[6-5]:(3)35(3):(1)17(1):34:43:40:34:35:31:T15T:2, other males similar. Sternites 2–6 of females with about 45:(3)25(3):(1)20(1):27:35; setae on sternite 2 are close-set in a triangular group (Fig. 1). Though the tactile setae on tergite 11 and sternite 11 of the neotype are missing from their areoles, these are clearly present in many other specimens, both male and female. Internal genitalia of male typical of the Chernetidae, moderate in size and sclerotization. Spermathecae of female delicate and often destroyed in these preparations, but occasionally seen as 2 slender tubes of uniform diameter (Fig. 2). Chelicera 0.35–0.4 as long as carapace; hand usually with 7 setae (rarely 8 or 9), *is* and *ls* long, acuminate, *es* short, acuminate, *bs* usually acuminate, others denticulate; flagellum of 4 setae, denticulate distally; serrula of about 26 blades; galea of female long, slender, with 5–6 small rami, that of male a little smaller and with shorter rami. Palp robust, more so in male than in female (Figs. 3 and 4); L/B of trochanter 1.85–2.0, femur 2.85–3.0, patella 2.4–2.65, and chela (without pedicel) 2.05–2.3; L/D of hand (without pedicel) 1.01–1.15; movable finger 0.97–1.03× as long as hand. Surfaces finely to moderately granulate; most setae on medial sides of trochanter, femur, and patella narrow clavodentate, on lateral sides somewhat longer and more pointed, those on chela quite long, finely denticulate to acuminate; setae on chelal hand densely set in male, less so in female. Trichobothriotaxy as shown in Figs. 5 and 6; one paratype male has an extra trichobothrium *eb* on fixed finger. Each finger with 45–50 cusped marginal teeth and 9–13 external and 7–11 internal accessory teeth. Venom apparatus well developed only in movable finger, nodus ramosus between trichobothria *t* and *st*. Legs moderately slender: leg IV with L/D of femur+patella 3.25–3.55, tibia 4.45–4.8, tarsus 4.45–4.95. Tarsus of leg IV with a long, erect, tactile seta about 2/3 length of segment from proximal end (Fig. 7).

Tritonymph.—Much like adults but smaller and more robust. Chelicera with 6 setae on hand; flagellum of 4 setae. Palp with L/B of femur 2.65–2.7; patella 2.15–2.25; chela (without pedicel) 2.6;

L/D of hand (without pedicel) 1.4–1.45; movable finger 0.90 as long as hand. Fixed chelal finger with 7 trichobothria, movable finger with 3. Leg IV with L/D of femur+patella 3.25–3.4; tibia 3.9–4.1; tarsus 3.7–4.0; tactile seta on tarsus as in adult.

Deutonymph.—Like tritonymph but smaller. Chelicera with 5 setae on hand; flagellum of 4 setae. Palp with L/B of femur 2.45; patella 2.3; chela (without pedicel) 2.7; L/D of hand (without pedicel) 1.55; movable finger 0.88 as long as hand. Fixed chelal finger with 6 trichobothria, movable finger with 2. Leg IV with L/D of femur+patella 3.35; tibia 3.75; tarsus 3.6; tactile seta on tarsus as in adult.

Measurements (mm), Male.—Figures given first for neotype, followed in parentheses by ranges for 4 paratypes. Body L 4.85 (3.94–4.55). Carapace L 1.48 (1.27–1.40). Chelicera L 0.525 (0.48–0.52). Palp: trochanter 0.83 (0.74–0.83)/0.43 (0.39–0.415); femur 1.41 (1.33–1.37)/0.495 (0.45–0.48); patella 1.41 (1.26–1.36)/0.55 (0.49–0.52); chela (without pedicel) 2.33 (2.11–2.18)/1.06 (0.94–1.06); hand (without pedicel) 1.22 (1.11–1.15)/1.21 (0.96–1.13); pedicel L 0.19 (0.16–0.18); movable finger L 1.26 (1.11–1.19). Leg I: femur 0.415 (0.42–0.445)/0.30 (0.265–0.29); patella 0.64 (0.605–0.635)/0.265 (0.245–0.255); tibia 0.755 (0.69–0.725)/0.185 (0.17–0.18); tarsus 0.63 (0.57–0.635)/0.13 (0.12–0.125). Leg IV: femur+patella 1.26 (1.13–1.21)/0.355 (0.325–0.355); tibia 1.07 (0.94–1.03)/0.22 (0.205–0.215); tarsus 0.725 (0.69–0.725)/0.155 (0.14–0.155).

Female.—Ranges for 3 paratypes. Body L 5.29–5.66. Carapace L 1.41–1.52. Chelicera L 0.50–0.55. Palp: trochanter 0.77–0.83/0.41–0.43; femur 1.33–1.44/0.45–0.495; patella 1.30–1.37/0.495–0.55; chela (without pedicel) 2.12–2.22/0.85–0.955; hand (without pedicel) 1.17–1.26/0.83–0.895; pedicel L 0.18–0.19; movable finger L 1.11–1.19. Leg I: femur 0.40–0.45/0.28–0.30; patella 0.635–0.665/0.245–0.26; tibia 0.69–0.74/0.17–0.185; tarsus 0.59–0.62/0.125–0.13. Leg IV: femur+patella 1.19–1.27/0.355–0.38; tibia 0.96–1.04/0.20–0.215; tarsus 0.67–0.725/0.15–0.16.

Tritonymph.—Ranges for 3 paratypes. Body L 3.77–4.13. Carapace L 1.05–1.13. Chelicera L 0.38–0.40. Palp: trochanter 0.525–0.55/0.28–0.30; femur 0.87–0.95/0.325–0.35; patella 0.805–0.85/0.36–0.39; chela (without pedicel) 1.41–1.47/0.54–0.56; hand (without pedicel) 0.785–0.815/0.55–0.585; pedicel L 0.18–0.19; movable finger L 0.70–0.74. Leg IV: femur+patella 0.83–0.88/0.25–0.27; tibia 0.63–0.68/0.16–0.175; tarsus 0.49–0.50/0.125–0.14.

Deutonymph.—One specimen. Body L 2.84. Carapace L 0.80. Chelicera L 0.31. Palp: trochanter 0.39/0.215; femur 0.60/0.245; patella 0.57/0.25; chela (without pedicel) 1.00/0.37; hand (without pedicel) 0.56/0.36; pedicel L 0.075; movable finger L 0.495. Leg IV: femur+patella 0.62/0.185; tibia 0.47/0.125; tarsus 0.38/0.105.

Types Examined.—CHILE: [DE LOS LAGOS], Los Muermos, forest, 19 Jan 1951, E. S. Ross and A. E. Michelbacher, 9 males, 5 females, 3 tritonymphs, in 2 vials; this material was at some time studied by Beier, and a label was inserted, reading "*Chelanops rotundimanus* (Ell.) det. Beier ♂ ♀"; 5 males, 3 females, 3 tritonymphs have been mounted on slides. One of the mounted males, (WM7883.01002), is hereby designated the NEOTYPE; the others are paratypes.

Other Material Examined.—CHILE: [BIO-BIO], Nuble, 18 km E of San Carlos, 24 Dec 1950, Ross and Michelbacher, 1 male, 1 female, 1 deutonymph, in alcohol; [DE LA ARAUCANIA], 20 km E of Temuco, 8 Jan 1951, Ross and Michelbacher, 1 male, 1 tritonymph, in alcohol; [DE LA ARAUCANIA], 16 km NE of Pucón, 12 Jan 1951, Ross and Michelbacher, 1 male, 4 females, 1 deutonymph, mounted on slides; "Osorno Prov." [DE LOS LAGOS], valley forest, 18 km W of Purrangué, 16 Jan 1951, Ross and Michelbacher, 8 males 2 females, 1 tritonymph, in alcohol.

Chelanops skottsbergi (Beier), NEW COMBINATION

Stigmachernes skottsbergi Beier 1957: 457, fig. 3; Harvey 1991: 634.

Type locality. Juan Fernandez Islands, Chile.

According to Beier's (1957) description and figure, this species has all of the important characters of the genus *Chelanops* as defined above, even though the

palps are not as robust as those of *C. coecus*. Because *S. skottsbergi* is the type species of *Stigmachernes*, that genus becomes a synonym of *Chelanops*.

DISCUSSION

It is worth noting that although the neotype series was labelled "*Chelanops rotundimanus* (Ell.)," Beier (1959) synonymized *rotundimanus* with *coecus*, and in 1964b he treated these very specimens as *coecus*.

The original type locality of *Chelifer (Chelanops) coecus*, as given by Gervais, was near Calbuco, De los Lagos, Chile. The neotype series is from Los Muermos, also in De los Lagos, less than 40 km NW of Calbuco. The type locality of *Chelifer (Trachychernes) rotundimanus* is Philipi, De los Lagos, about the same distance NE of Los Muermos. The other specimens studied here are from Temuco, Pucón, and Nuble, some 2–300 km farther north. *Chelanops coecus* has also been reported from several other places in Chile and in Argentina (Beier 1959, 1962, 1964a, b, c; Cekalovic 1976), but the status of these records is uncertain.

Chelanops costaricensis, described by Beier in 1932 and one of the four species of *Chelanops* recognized by him at that time, was later declared to be a synonym of *Semeiochernes militaris* Beier (Beier 1954: 139, Harvey 1991: 632).

Altogether, about 70 species of pseudoscorpions have been assigned to the genus *Chelanops* at one time or another. Most have been reassigned subsequently to other genera, so that at the present time Harvey's Catalogue (1991: 554–555) lists 9 species in addition to *coecus* in the nominate subgenus of *Chelanops*. The structure of the spermathecae is not known for any of these species; but, on other grounds, most of them do not appear to belong in *Chelanops* as redefined above.

Chelanops chilensis Beier 1932, from Villarica, De la Araucania, southern Chile.

Relying on Beier's descriptions, figures and keys (1932: 178, fig. 186; 1933: 538, fig. 10), it appears certain that this is a synonym of *Chelanops coecus*. The major difference, in Beier's opinion, seems to have been the absence of tactile setae from the 11th tergite of *chilensis* compared to *rotundimanus* (= *coecus*); however, as mentioned above, the tactile setae of both the 11th tergites and 11th sternites may be lost from their areoles in preserved specimens. All other features of the two taxa appear to be identical, within the limits described above.

Chelanops affinis Banks 1894, from Florida, USA.

This species certainly belongs in another genus, according to observations I have made on the types (in the Museum of Comparative Zoology, Cambridge, Massachusetts) and numerous other specimens. It will be treated in detail in a later publication.

Chelanops altimanus (Ellingsen 1910), from the Virgin Islands, West Indies.

This species has recently been shown to be a representative of the genus *Dinocheirus* (Muchmore 1997).

Chelanops nigrimanus Banks 1902, from the Galapagos Islands, Pacific Ocean.

This inadequately described species was not mentioned by Beier in 1932 or 1933. It was listed, without comment, as *Parachernes (Argentochnes) nigrimanus* (Banks) by Chamberlin (1934) and as *Parachernes nigrimanus* (Banks)

by Beier (1940); these actions have not been noted by any other author, even by Harvey (1991), who retained the species in *Chelanops*. In a footnote in his paper on "The species of the pseudoscorpion genus *Chelanops* described by Banks," Hoff stated that *C. nigrimanus* Banks is a "*Species incertae sedis*; deposition of type individuals uncertain, perhaps in the National Museum. Dr. Chapin as yet has not located the type specimens." (1947: 473). This information may also have been known to Beier, who in 1948 (p. 472) described a species from Costa Rica as *Parachernes (Argentochernes) nigrimanus*. Further, Beier (1977, 1978) described three species and one subspecies of *Parachernes* from the Galapagos Islands, two from Isabela (= Albemarle), the type locality of *C. nigrimanus* Banks, without mention of the latter species. Recently, the holotype of *Chelanops nigrimanus* has been found by M. S. Harvey in the J. C. Chamberlin Collection of Pseudoscorpions, now housed in the Entomology Department of the California Academy of Sciences; it is a female, mounted on a microscope slide by Chamberlin (JC-799.01001; CAS Type No. 17500), and is in good condition. I have examined the specimen and find that it is, as Chamberlin determined, a representative of the genus *Parachernes* Chamberlin. Therefore, *Parachernes nigrimanus* Beier, 1948 becomes a junior primary homonym of *Parachernes nigrimanus* (Banks, 1902); for that Costa Rican species I propose the replacement name, *Parachernes beieri*.

The following species require further study before their status can be known:

Chelanops atlanticus Beier 1955a, from Tristan da Cunha, South Atlantic Ocean.

Chelanops insularis Beier 1955b, from the Juan Fernandez Islands, Pacific Ocean west of Chile.

Chelanops kuscheli Beier 1955b, from the Juan Fernandez Islands, Pacific Ocean west of Chile.

Chelanops occultus Beier 1964b, from central Chile.

Chelanops pugil Beier 1964a, from San Ambrosio Island, Pacific Ocean west of Chile.

They appear to differ in various ways: in the presence or absence of tactile setae on the 11th tergite, the presence or absence and size and location of a tactile seta on the 4th tarsus, and the relative positions of trichobothria *est* and *ist* on the palpal chela; and, as mentioned, the spermathecae are not known for any of them. Reexamination of the types, or of material which is certainly conspecific, is needed to place these species properly.

The status of the several species presently placed in the subgenus *Neochelanops* Beier 1964 (Harvey 1991: 555–556) is uncertain. If the descriptions by Tullgren (1900) and Beier (1964b) can be relied on, the type species *Chelifer (Chelanops) patagonicus* Tullgren is not congeneric with *Chelifer (Chelanops) coecus* Gervais. Only restudy of the types can resolve these problems.

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